

SUPERFUND RESPONSE ACTION PRIORITY PANEL REVIEW FORM

Date Form Completed: October 31, 2018

General Site Information

Region:	6	City:	Bristow	State:	OK
CERCLIS EPA ID:	OK0001010917	CERCLIS Site Name:	Wilcox Oil Company		
NPL Status: (P/F/D)	Final	Year Listed to NPL:	2013		

Brief Site Description: (Site Type, Current and Future Land Use, General Site Contaminant and Media Info, Site Area and Location information.)

The Site is an abandoned and mostly demolished oil refinery located northeast of Bristow, Creek County, Oklahoma. The Site spans approximately 140 to 150 acres in Creek County, Oklahoma, and is flanked by Route 66 to the west; a residential area and Turner Turnpike to the northwest and north; Sand Creek to the west and southwest; and residential, agricultural, and wooded areas to the east and south. About 2,404 people live within a mile of the site and about 6,134 people live within four miles of the site (2010 Census). The drainage pattern of the property is primarily towards Sand Creek.

Records indicate the property was used for oil refinery operations from 1915 until November 1963 and consisted of two refinery process areas and two tank farm storage areas. Oil refining began in 1915 at the Lorraine Refinery followed by operations at the Wilcox Oil Refinery. A modern skimming and cracking plant with an operating capacity of 4,000 barrels of crude oil per day was constructed for the Wilcox Oil Refinery in 1929. The Wilcox Oil Company expanded when it acquired the Lorraine Refinery in 1937.

After the refinery operations ceased and most of the tanks and buildings were demolished and sold for scrap, the property was sold to private interests. Beginning in 1975 with the construction of a church and parsonage, private residences were constructed on six parcels of land that were part of the former refinery operations, with the most recent being constructed in 2003. As a result, there are seven residential properties located within former tank or refinery operation areas, three of which are occupied and one periodically rented. In addition, three occupied residential properties on the eastern portion of the Site (East Tank Farm) use water from domestic/private wells.

Site investigation activities identified two source materials, tank sludge/solids and the lead additive area solids, that are the focus of this source control action. The lead additive area is contaminated with high levels of lead and phenols. According to a 1930 article published in, *The Refiner and Natural Gasoline Manufacturer*, the Wilcox Oil Company refinery used sodium plumbite (Na_2PbO_2) as an additive for gasoline to remove sulfur impurities and meet corrosion specifications. This area is denuded of vegetation and covered by silty sparkling sand and a white, salt-like substance. Significant surface erosion from this area extends to the south towards Sand Creek.

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The tank sludge/solids area is contaminated with oily tar-like viscous liquids and/or black dry solids. These areas are associated with former tank storage locations. Both the liquid and solid forms are found at and below the surface to depths up to 6 feet below ground surface.

General Project Information

Type of Action:	Remedial	Site Charging SSID:	06GG
Operable Unit:	01	CERCLIS Action RAT Code:	
Is this the final action for the site that will result in a site construction completion?			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will implementation of this action result in the Environmental Indicator for Human Exposure being brought under control?			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Response Action Summary

Describe briefly site activities conducted in the past or currently underway:

The EPA and the ODEQ have conducted multiple investigations at the Site since 1994. The associated historical documents are listed below.

- Preliminary Assessment of the Wilcox Oil Company (ODEQ, 1994)
- Expanded Site Inspection (ESI) Report – Wilcox Oil Company (Weston, 1997)
- Site Assessment Report for Wilcox Refinery (Ecology and Environment, Inc., 1999)
- Preliminary Assessment of the Lorraine Refinery Site (ODEQ, 2008)
- Site Inspection Report – Lorraine Refinery (ODEQ, 2009)
- ESI Report – Lorraine Refinery (ODEQ, 2010)
- ESI Report – Wilcox Refinery (ODEQ, 2011)
- Supplemental Sampling Report for Wilcox ESI (ODEQ, 2012)

Following Site listing on the NPL, the EPA, in conjunction with ODEQ, performed additional Site investigations. The EPA is currently working on the Site-wide remedial investigation (RI) to fully characterize the nature and extent of contamination, potential transport pathways, and potential human health and environmental risks. This information will be provided in the final RI and Risk Assessment reports for the Site.

Specifically identify the discrete activities and site areas to be considered by this panel evaluation:

The major components of the remedy include excavation, treatment and offsite disposal at an estimated present worth cost of \$4,135,294.

- Approximately 2,269 cubic yards (y³) of lead additive area source material and 28,093 y³ of tank waste source material will be excavated for a total of approximately 30,362 y³.
- Approximately 2,269 y³ of lead additive area source material will be treated through stabilization/solidification.

- All excavated and treated source material will be transported to an offsite permitted and regulated disposal facility.
- Excavated areas will be sampled, backfilled with clean soil from an offsite location, and re-vegetated.
- All excavated areas will be graded for drainage.

A total of 9 source areas are identified for source control action. Two (2) are within 225 - 300 feet of a residence, 5 are within 225 feet of either Sand Creek or the East Tributary that drains to Sand Creek, 1 is located on a residential property, and the last is located within a cow pasture. Fencing currently restricts and limits direct exposure for the short-term.

Briefly describe additional work remaining at the site for construction completion after completion of discrete activities being ranked:

The Site-wide RI/FS is currently ongoing. Likewise, the Site-wide ecological and human health risk assessments are ongoing. This action is an early action limited in scope to address tank waste and an interim action limited in scope to address the lead additive area. Because this action is not the final remedy for the Site, the remaining areas of the Site will be addressed and documented in a future final Site-wide decision document after completion of the RI/FS. This source control action will not preclude implementation of or be inconsistent with any future final site-wide decisions.

Response Action Cost

Total Cost of Proposed Response Action:

(\$ amount should represent total funding need for new RA funding from national allowance above and beyond those funds anticipated to be utilized through special accounts or State Superfund Contracts.)

\$4,100,000

Source of Proposed Response Action Cost Amount:

(ROD, 30%, 60%, 90% RD, Contract Bid, USACE estimate, etc...)

Summary of Alternatives Screening and Review for the Wilcox Oil Company Superfund Site Source Control Action April 2018. The estimates are based on current site data and characteristics related to the tank waste and the lead additive area.

The final design is expected to be completed by May 2019, and will provide a detailed summary of response actions and associated cost.

The focus of this response action is to implement an early/interim action that addresses 9 source areas across the site. By taking this source control action, significant human health and ecological risk reduction will be accomplished through removal of primary sources located throughout the Site at or near the soil surface, specifically residential properties. In addition, further migration and environmental degradation of adjacent waterways (e.g., Sand Creek and the East Tributary), wetlands, and stream riparian areas will be eliminated.

Breakout of Total Action Cost Planned Annual Need by Fiscal Year:

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(If the estimated cost of the response action exceeds \$10 million, please provide multiple funding scenarios for fiscal year needs; general planned annual need scenario, maximum funding scenario, and minimum funding scenario.)

If money is made available by Q3/2019, it is anticipated that implementation of this response action will be completed by Q2/2020.

Other information or assumptions associated with cost estimates?

N/A

Readiness Criteria

1. Date State Superfund Contract or State Cooperative Agreement will be signed (Month)?

The response action will need a new SSC in place by May 2019. ODEQ and EPA have drafted the **document and will use the final design document as the basis for the state's 10% share.** ODEQ has accounted for a portion of their anticipated 10% share in their legislative funding estimates.

2. If Non-Time Critical, is State cost sharing (provide details)?

N/A

3. If Remedial Action, when will Remedial Design be 95% complete?

RD is expected to be completed by May 2019.

4. When will Region be able to obligate money to the site?

August/September 2019

5. Estimate when on-site construction activities will begin:

December/January 2019

6. Has CERCLIS been updated to consistently reflect project cost/readiness information?

Yes (Financial Action/Seq RA002)

Site/Project Name:

Wilcox Oil Company

Criteria #1 - RISKS TO HUMAN POPULATION EXPOSED (Weight Factor = 5)

Describe the exposure scenario(s) driving the risk and remedy. Include risk and exposure information on current/future use, on-site/off-site, media, exposure route, and receptors:

The Site-wide RI/FS is currently ongoing. Likewise, the Site-wide ecological and human health risk assessments are ongoing. This action is an early action limited in scope to address tank waste and an interim action limited in scope to address the lead additive area. Because this action is not the final remedy for the Site, the remaining areas of the Site will be addressed and documented in a future final Site-wide decision document after completion of the RI/FS. This source control action will not preclude implementation of or be inconsistent with any future final site-wide decisions.

The Site includes residential, agricultural, and business property that drains directly to two perennial waterbodies. The current residential and business land uses and surface water uses are not expected to change. In addition, the owner of the agricultural land indicated that this property may be used as residential property in the future.

Based on data collected during RI activities, concentrations of contaminants associated with the tank waste and the lead additive area exceed residential cancer and noncancer screening levels by orders of magnitude (Table 1/Criteria 3). In addition, RI data show that the indoor air and direct exposure pathways are complete for the tank waste while the direct exposure pathway is complete for the lead additive area. Tank waste has been verified within 300 feet of two residential properties. If no action is taken, these sources will continue to pose a long-term health threat to human and ecological receptors.

Based on data collected during RI activities, contaminants from the tank waste and the lead additive area have migrated to soil, sediment, shallow ground water, and indoor air. These sources are found on or near the ground surface. The source areas have limited or no containment features for floods and many of the original berms have either been leveled or cut to allow drainage from the sources to surrounding areas. No containment features are present around the lead additive area allowing runoff to drain directly to a ditch that discharges to Sand Creek. In addition, shallow ground water is observed migrating through the banks of Sand Creek. Tank waste has been verified within one cow pasture while tank waste and lead additive area sources have been verified within 225 feet of perennial waterbodies. If no action is taken, these sources, present at or near the ground surface, will continue to pose a long-term threat of release of hazardous substance to the environment, specifically the perennial water bodies.

The tank waste and lead additive area are source materials; however, only the lead source material is identified as principal threat waste (PTW). The source control action addresses these sources through removal, treatment of the lead additive area, and offsite disposal. Addressing the tank waste and the lead additive area early in the remedial process eliminates sources that are a continual source of direct exposure to humans living on or near these areas, eliminates immediate human health and ecological risk, eliminates a continual source of migration to wetland and surface water body environments, and reduces limitations on reuse and redevelopment, specifically the use of the properties as residential. In addition, removal of these source materials eliminates the migration of contaminants to ground water.

Table 1: Comparison of site data to Health-Based Screening Levels¹

	Contaminant	Data Results (mg/kg)	Health-Based Screening Level (mg/kg)	Health-Based Screening Level Basis
Lead Additive Area	Lead	105,000	800	Protection of blood lead levels in workers
Tank Waste	Benzo(a)anthracene	12	1.1	Residential Cancer Screening Number at 10-6 Risk
	Benzo(a)pyrene	12	0.11	Residential Cancer Screening Number at 10-6 Risk
	Benzo(b)fluoranthene	20	1.1	Residential Cancer Screening Number at 10-6 Risk
	Indeno(1,2,3-cd)pyrene	4.4	1.1	Residential Cancer Screening Number at 10-6 Risk
	2-methylnaphthalene	1400	240	Residential Non-cancer Screening Number at Hazard Index=1
	Naphthalene	14	3.8	Residential Cancer Screening Number at 10-6 Risk

Contamination resulting from source material migration

	Contaminant	Data Results (µg/l)	Health-Based Screening Level (µg/l)	Health-Based Screening Level Basis
Shallow ground water	2-methylphenol	1.5x10 ⁶	930	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	Phenol	340,000	5800	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	2,4 dimethylphenol	1.8x10 ⁶	360	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	Lead	>752	15	Action Level for Drinking Water
	Benzene	2400	5	Maximum Contaminant Level for Drinking Water

	Contaminant	Data Results (mg/kg)	Health -Based Screening Level (mg/kg)	Health/Eco -Based Screening Level Basis
Sediment	Lead	224	17	Human Health Bioaccumulation Screening Level ²
			35	Protection of Benthic Invertebrates Screening Level ³

1- Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2017

2- State of Oregon Department of Environmental Quality, *Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment* (2007), Table A-1a. Used for chemicals bioaccumulating into fish with subsequent human ingestion.

3- Ecological Screening Values for Freshwater Sediment from TCEQ's *Draft Conducting Ecological Risk Assessments at Remediation Sites in Texas* . January 2014.

mg/kg=milligram per kilogram

µg/l=micrograms per liter

Data presented are the highest recorded results.

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Estimate the number of people reasonably anticipated to be exposed in the absence of any future EPA action for each medium for the following time frames:

<u>Medium</u>	<u><2yrs</u>	<u><10yrs</u>	<u>>10yrs</u>
Tank Waste	2,404	2,404	4,808
Lead Additive Area	2,404	2,404	4,808
Sediment	2,404	2,404	4,808

Discuss the likelihood that the above exposures will occur:

The site is secured with fencing, except for access to Sand Creek. Although there are fences around the site in many areas, evidence of vandalism and trespassing on these properties occurs regularly and includes squatting, theft, and mischief destruction.

Other Risk/Exposure Information?

The RI/FS and risk assessments are ongoing.

Site/Project Name: Wilcox Oil Company

Criteria #2 – SITE/CONTAMINANT STABILITY (Weight Factor = 5)

Describe the means/likelihood that contamination could impact other areas/media given current containment:

Previous and current Site investigations document releases of hazardous substances to indoor air, sediment, shallow ground water, and soil. A total of 9 source areas are identified for source control action: Two (2) are within 225 - 300 feet of a residence, 5 are within 225 feet of either Sand Creek or the East Tributary that drains to Sand Creek, 1 is located on a residential property, and the last is located within a cow pasture. Currently, impacts to ground water and surface water have not been fully evaluated; however, it is noted that shallow water samples had concentrations of contaminants and there is evidence of water migration through the banks of Sand Creek.

Tank waste is present in numerous areas across the Site either at the surface or just below the surface. During the warm summer months, the liquid wastes migrate to the surface and spread across the soil. The heat softens the tank waste facilitating migration. In addition, heavier objects (e.g., human, cow, deer, vehicle) that travel across these sources will sink into or push the tank waste to the surface. This has been observed during Site investigation activities.

Are the contaminants contained in engineered structure(s) that currently prevents migration of contaminants? Is this structure sound and likely to maintain its integrity?

No.

Are the contaminants in a physical form that limits the potential to migrate from the site? Is this physical condition reversible or permanent?

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No. The source material will continue to migrate and contaminate the surrounding soil, sediment, shallow ground water, and indoor air. Implementing the remedy will remove the sources.

Are there institutional physical controls that currently prevent exposure to contamination? How reliable is it estimated to be?

There are no institutional controls in place.

Other information on site/contaminant stability?

The tank waste and lead additive area are source materials that contain contaminants exceeding health-based levels. Data document that these are sources from which contaminants migrate to soil, sediment, shallow ground water, and indoor air. These sources will continue to support contaminant migration if left in place. Based on current data, addressing these sources early in the remedial investigation phase is supported and will result in overall risk reduction to human health and the environment.

Site/Project Name: Wilcox Oil Company

Criteria #3 – CONTAMINANT CHARACTERISTICS (Weight Factor = 3)
(Concentration, toxicity, and volume or area contaminated above health based levels)

List Principle Contaminants (Please provide average and high concentrations.):
(Provide upper end concentration (e.g. 95% upper confidence level for the mean, as is used in a risk assessment, or maximum value [assuming it is not a true outlier], along with a measure of how values are distributed {e.g. standard deviation} or a central tendency values [e.g., average].)

<u>Contaminant</u>	<u>*Media</u>	<u>**Concentrations</u>
Lead	Granular lead waste	Maximum: 105, 000 mg/kg
Benzo(a)anthracene	Oily tar-like waste	Maximum: 12 mg/kg
Benzo(a)pyrene	Oily tar-like waste	Maximum: 12 mg/kg
Benzo(b)fluoranthene	Oily tar-like waste	Maximum: 20 mg/kg
Indeno(1,2,3-cd)pyrene	Oily tar-like waste	Maximum: 4.4 mg/kg
2-methylnaphthalene	Oily tar-like waste	Maximum: 1400 mg/kg
Naphthalene	Oily tar-like waste	Maximum: 14 ug/l

*(*Media: AR – Air, SL – Soil, ST – Sediment, GW – Groundwater, SW – Surface Water)*

*(**Concentrations: Provide concentration measure used in the risk assessment and Record of Decision as the basis for the remedy.)*

Describe the characteristics of the contaminant with regards to its inherent toxicity and the significance of the concentrations and amount of the contaminant to site risk. *(Please include the clean up level of the contaminants discussed.)*

Most of the contaminants are polycyclic aromatic hydrocarbons. Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer). Benzo(a)pyrene is a polycyclic aromatic hydrocarbon (PAH), and EPA determined it is carcinogenic to humans based on strong and consistent evidence in animals and humans.

Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production. Exposure to large quantities of lead can result in blood anemia, kidney damage, colic, muscle weakness, brain damage, slowed mental and physical growth, prematurely born babies, and slow mental development.

<u>Contaminant</u>	<u>Media</u>	<u>Health-based Target Level¹</u>	<u>Basis</u>
Lead	Granular lead waste	800 mg/kg	Protection of blood lead levels in workers
Benzo(a)pyrene	Oily tar-like waste	0.11 mg/kg	Residential Cancer Screening Number at 10-6 Risk

1- Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2017

Describe any additional information on contaminant concentrations which could provide a better context for the distribution, amount, and/or extent of site contamination. *(e.g. frequency of detection/outlier concentrations, exposure point concentrations, maximum or average concentration values, etc.....)*

Tank waste and the lead additive area are distinct source areas that will be excavated vertically and horizontally based on field screening methods and visual observations. This methodology is proven successful with the completion of a removal action in 2018.

Other information on contaminant characteristics?

None noted.

Site/Project Name: Wilcox Oil Company

Criteria #4 – THREAT TO SIGNIFICANT ENVIRONMENT (Weight Factor = 3)
(Endangered species or their critical habitats, sensitive environmental areas.)

Describe any observed or predicted adverse impacts on ecological receptors including their ecological significance, the likelihood of impacts occurring, and the estimated size of impacted area:

The Site-wide RI/FS is currently ongoing. The final Ecological Risk Assessment which will define the full extent of ecological risks at the Site has not been completed. Ecological risk assessments on sites with the same contaminants and metals indicate that ecological habitat and inhabitants are sensitive to lead and benzo(a)pyrene (PAHs). For example, PAHs presented risk to both terrestrial and aquatic species at the American Creosote Works site (LA), Ruston Foundry (LA), and the Imperial Refining Site (OK).

The predicted adverse impacts on ecological receptors are primarily associated with Sand Creek, the East Tributary, and onsite wetland areas. Sand Creek flows southeast until it merges with Little Deep Fork Creek approximately 3.5 miles from the Site. According to the State of Oklahoma, Sand Creek is considered a Habitat Limited Aquatic Community, and a Secondary Body Contact Beneficial Use, as well as having agricultural and aesthetic beneficial uses. Little Deep Fork Creek downstream from Sand Creek is considered a Warm Water Aquatic Community, and a Primary Body Contact Beneficial Use, as well as having agricultural and aesthetic beneficial uses. Also, within 15-miles of the Site is the Heyburn Wildlife Management Area. This area and its associated watershed are designated sensitive areas by the Oklahoma Department of Wildlife Conservation. The site is also potentially located in the American Burying Beetle territory.

Would natural recovery occur if no action was taken? ☐ Yes ☒ No
If yes, estimate how long this would take.

Other information on threat to significant environment?

The EPA is currently working on the Site-wide RI to fully characterize the nature and extent of contamination, potential transport pathways, and potential human health and environmental risks. The full extent of impacts to the environment are unknown; however, data show impacts to adjacent creeks and residential properties.

Site/Project Name: Wilcox Oil Company

Criteria #5 – PROGRAMMATIC CONSIDERATIONS (Weight Factor = 4)
(Innovative technologies, state/community acceptance, environmental justice, redevelopment, construction completion, economic redevelopment.)

Describe the degree to which the community accepts the response action.

A Proposed Plan public meeting was held on July 10, 2018. There were no negative comments received from the public on the proposed remedy of excavation, treatment, and offsite disposal. The Oklahoma Department of Environmental Quality (ODEQ) and EPA routinely meet with residential owners to discuss field activities, property data results, and planned upcoming actions. In addition, open house and public availability sessions are held with the public either prior to or during such field activities.

The State of Oklahoma concurs with the selected source control remedy. The EPA consulted with the Muscogee (Creek) Nation, Cherokee Nation, and Sac and Fox Nation to coordinate review and discussion of the source control remedial action.

To better understand the future expectation and uses for the site, EPA completed a reuse assessment and interviews with property owners and area officials in 2018. The consensus is that the properties should be without restrictions such that the owner can use the property for whatever purpose the owner wishes, whether that be residential, commercial/industrial, or agricultural.

Describe the degree to which the State accepts the response action.

The Oklahoma Department of Environmental Quality (ODEQ) was thoroughly involved in the development and review of the 2018 Source Control Proposed Plan. Likewise, the Muscogee (Creek) Nation, Cherokee Nation, and Sac and Fox Nation were provided the opportunity to meet, review, and consult on the proposed plan.

ODEQ supports the offsite disposal option due to complete removal of source material and no operations and maintenance. In addition, source removal addresses residential properties and migration to Sand Creek.

Describe other programmatic considerations, e.g.; natural resource damage claim pending, Brownfields site, use of innovative technology, construction completion, economic redevelopment, **environmental justice, etc...**

Taking appropriate source control actions at sites during the investigation stage of the process is consistent with the National Contingency Plan (NCP) and existing EPA guidance. The NCP [40 CFR § 300.430(a)(1)] states, **"Remedial actions are to be implemented as soon as site data and information make it possible to do so."** This is further clarified in the preamble to the NCP (Federal Register, 1990),

EPA expects to take early action at sites where appropriate and to remediate sites in phases using operable units as early actions to eliminate, reduce or control the hazards posed by a site or to expedite the completion of total site cleanup. In deciding whether to initiate early actions. EPA must balance the desire to definitively characterize site risks and analyze alternative remedial approaches for addressing those threats in great detail with the desire to implement protective measures quickly.

EPA promotes the responsiveness and efficiency of the Superfund program by encouraging action prior to or concurrent with conduct of an RI/FS as information is sufficient to support a remedy selection. These actions may be taken under removal or remedial authorities as appropriate.

The source control action is appropriate and consistent with the NCP and existing EPA guidance. The source control action will

- eliminate, reduce, or control actual or potential risks and hazards posed by the source material;
- eliminate, reduce, or control actual or potential migration of contaminants or further environmental degradation posed by the source material;

- expedite Site cleanup completion;
- promote prompt risk reduction and increase Site response efficiency; and,
- be consistent with the final Site remedy.

The Administrator's Superfund Task Force provided recommendations for improving and expediting site cleanups and promoting redevelopment. This action supports these recommendations by taking interim and early actions to address source material to remove the threat to human health and eliminate the future migration of contaminants. This allows EPA to efficiently utilize resources and address the highest risks first. This source control action will not preclude implementation of or be inconsistent with any future final site-wide decisions.